THE INSTITUTE OF PHYSICS

47 BELGRAVE SQUARE, LONDON, S.W.1

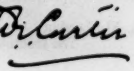
BULLETIN

No. 25 *Information in this circular is not intended for general publication: your copy should not therefore be passed to a library.* JANUARY 1952

A NEW YEAR MESSAGE FROM THE PRESIDENT

Our profession has never been in so healthy a condition as now. The contribution of the physicist to the national life is beginning to be appreciated, and he is consequently acquiring a standing appropriate to his qualifications and to the service which he renders to the community. To bring about such recognition is one of the major aims of the Institute, and the present status of the physicist is due in no small measure to its efforts. In this and other directions the Institute will continue to serve you to the best of its ability. Much of its work does not receive publicity, but it is nevertheless effective and valuable. I am confident that it will continue so, with your support and encouragement. Membership is growing in a gratifying manner; we must not be content until it is completely representative of the profession.

I offer you my sincere wishes for your happiness and success in 1952.



BRANCH AND GROUP MEETINGS

Session 1951–52 (Second Half)

Date	*Place*	*Speaker*	*Title*	*Time*	*Branch or Group*
Jan. 11	**Glasgow** The University	**Prof. P. I. Dee, F.Inst.P., F.R.S.**	**Lecture course for members only (1).** The development of concepts of physical science —Newton—classical mechanics.	7.00 p.m.	Scottish
Jan. 15	**Sunderland** Technical College	**Mr. R. W. Douglas, F.Inst.P.**	The physics of glass.	6.15 p.m.	Electronics North Eastern
Jan. 17	**Edinburgh** The University	**Mr. W. D. Oliphant, F.Inst.P., F.R.S.E.**	**Lecture course on semiconductors (1).** Introduction.	7.00 p.m.	Scottish
		Dr. H. M. Melvin	Fundamental principles.		
Jan. 18	**Glasgow** The University	**Mr. J. McNeill, A.Inst.P.**	**Lecture course for members only (2).** Carnot, Kelvin Boltzmann —Heat and the statistical picture of matter.	7.00 p.m.	Scottish
Jan. 18	**London** The Institute's House	**Mr. W. D. Clark**	Non-destructive testing in a large chemical works.	6.30 p.m.	Industrial Radiology
Jan. 18	**Manchester** The University	**Dr. L. A. Sayce, F.Inst.P.**	Light, colour and radiation.	7.00 p.m.	Manchester
Jan. 22	**London** The Institute's House	**Mr. E. A. Newman, A.Inst.P.**	Storage in computors.	5.30 p.m.	Electronics
Jan. 22	**Dundee** University College	**Dr. L. H. Gray**	Some recent developments in the study of the biological actions of ionising radiations.	5.00 p.m.	Scottish
Jan. 23	**London** The Institute's House	**Mr. T. A. Eames, F.Inst.P.**	Physics in Railway research.	5.30 p.m.	London and Home Counties

Date	*Place*	*Speaker*	*Title*	*Time*	*Branch or Group*
Jan. 23	**Rugby**		Visit to the Laboratories of the British Thomson Houston Co. Ltd. (numbers limited)	3.30 p.m.	Midland
			Followed by		
		Dr. D. Tabor	Boundary lubrication.	6.00 p.m.	
Jan. 24	**Edinburgh** The University		**Lecture course on semiconductors (2).** Wave mechanics of electrons in periodic potential fields.	7.00 p.m.	Scottish
Jan. 25	**Glasgow** The University	**Mr. J. R. Atkinson, F.Inst.P.**	**Lecture course for members only (3).** Faraday, Maxwell—The electro-magnetic field.	7.00 p.m.	Scottish
Jan. 29	**Glasgow** The University	**Prof. Llewellyn-Jones, F.Inst.P.**	Physics of the electric spark.	7.00 p.m.	Scottish
Jan. 30	**London** The Institute's House	**Prof. F. R. Winton and Prof. J. E. Roberts, F.Inst.P.**	The place of physics in medical education.	5.30 p.m.	Education
Jan. 31	**London** The Institute's House	**Dr. F. H. Vanstone, A.Inst.P.** **Dr. A. C. Menzies, F.Inst.P.**	A flame method of spectrographic analysis. A recording microphotometer.	5.30 p.m.	Industrial Spectroscopy
Jan. 31	**Edinburgh** The University		**Lecture course on semiconductors (3).** Band theory of metals, insulators and semiconductors.	7.00 p.m.	Scottish
Feb. 1	**Glasgow** The University	**Dr. S. C. Curran, F.Inst.P.**	**Lecture course for members only (4).** Rutherford, Bohr—The structure of the atom.	7.00 p.m.	Scottish
Feb. 7	**Edinburgh** The University		**Lecture course on semiconductors (4).** Band theory of metals, insulators and semiconductors—continued.	7.00 p.m.	Scottish
Feb. 8	**Glasgow** The University	**Dr. W. McFarlane, F.Inst.P.**	**Lecture course for members only (5).** Einstein—Relativity.	7.00 p.m.	Scottish
Feb. 9	**Cardiff** University College	**Prof. O. G. Sutton, C.B.E., F.R.S.**	F. W. Lanchester and his contributions to aerodynamics.	2.00 p.m.	South Wales
Feb. 12	**Glasgow** The University	**Dr. V. E. Cosslett, F.Inst.P.**	Electron microscopy.	7.00 p.m.	Scottish
Feb. 13	**Edinburgh** The University	**Dr. V. E. Cosslett, F.Inst.P.**	Electron microscopy.	7.00 p.m.	Scottish
Feb. 14	**Edinburgh** The University		**Lecture course on semiconductors (5).** Statistical mechanics of electrons in solids. Miscellaneous topics.	7.00 p.m.	Scottish

Date	*Place*	*Speaker*	*Title*	*Time*	*Branch or Group*
Feb. 15	**Manchester** The University	**Dr. J. D. Craggs, F.Inst.P.**	Counting methods.	7.00 p.m.	Manchester
Feb. 19	**London** The Institute's House	**Dr. J. M. Thoday**	The mechanism of radiation—induced chromosome mutation.	5.30 p.m.	Electronics
Feb. 20	**London** The Institute's House		Annual General Meeting. Followed by	5.30 p.m.	London and Home Counties
		Dr. E. T. Eady	Physical basis of weather forecasting.		
Feb. 21	**Edinburgh** The University	**Dr. G. F. Garlick, F.Inst.P.**	**Lecture course on semiconductors (6).** Luminescence.	7.00 p.m.	Scottish
Feb. 22	**Glasgow** The University	**Dr. B. Touschek**	**Lecture course for members only (7).** Planck, Heisenberg, Schrödinger—quantum mechanics.	7.00 p.m.	Scottish
Feb. 22	**London** The Institute's House	**Mr. A. J. Axford**	The chemistry of radiographic film processing.		Industrial Radiology
Feb. 26	**Glasgow** The University	**Mr. J. E. Stanworth**	Structure and physical properties of glass.	7.00 p.m.	Scottish
Feb. 27	**Edinburgh** The University	**Mr. J. E. Stanworth**	Structure and physical properties of glass.	7.00 p.m.	Scottish
Feb. 28	**Birmingham** The University, Edgbaston	**Prof. F. W. Spiers**	Some applications of physics to medicine.	5.00 p.m.	Midland
Feb. 28	**Edinburgh** The University	**Mr. D. A. Wright, F.Inst.P.**	**Lecture course on semiconductors (7).** Electron emission from semiconductors.	7.00 p.m.	Scottish
Feb. 28	**Dundee** University College	**Mr. J. E. Stanworth**	Structure and physical properties of glass.	7.00 p.m.	Scottish
Feb. 29	**Glasgow** The University	**Prof. J. C. Gunn**	**Lecture course for members only (8).** Yukawa—Nuclear matter and the meson field.	7.00 p.m.	Scottish
Mar. 5	**London** The Institute's House	**Dr. J. Topping, F.Inst.P.**	Physics at E.T.H. Zurich.	5.30 p.m.	Education
Mar. 8	**Swansea** University College	**Major E. W. B. Gill, O.B.E.**	The electrification of water drops.	2.00 p.m.	South Wales
Mar. 11	**Glasgow** The University	**Mr. B. W. Robinson**	Fundamental standards.	7.00 p.m.	Scottish
Mar. 12	**Edinburgh** The University	**Mr. B. W. Robinson**	Fundamental standards.	7.00 p.m.	Scottish
Mar. 18	**London** The Institute's House	**Dr. E. Billig**	The physics of transistors.	5.30 p.m.	Electronics
Mar. 19	**London** The Institute's House	**Dr. W. R. Harper, F.Inst.P.**	The Volta/Helmholz hypothesis of frictional electricity.	5.30 p.m.	London and Home Counties
Mar. 20	**Birmingham** The Midland Hotel	**Dr. L. R. G. Treloar, F.Inst.P.**	Rubbers and fibres.	6.30 p.m.	Midland

Date	*Place*	*Speaker*	*Title*	*Time*	*Branch or Group*
Mar. 21	**Manchester** The University	**Dr. B. Bleaney**	Spectroscopy at centimetre wavelengths.	7.00 p.m.	Manchester
Mar. 21	**London** The Institute's House		Symposium—What is the use of standardisation?		Industrial Radiology
Apr. 3 Apr. 4	**Edinburgh**		Conference.		X-ray Analysis
Apr. 17 Apr. 18 Apr. 19	**London** The Institute's House	Conference on school and university examinations in physics (numbers limited).			Education
Apr. 25			Impressions of spectroscopy in the U.S.A.	5.30 p.m.	Industrial Spectroscopy
Apr. 25	**Aberystwyth** University College of Wales	**Prof. E. J. Richards**	Optical methods in aerodynamical research.	8.00 p.m.	South Wales
May 1	**Birmingham** The University	**Mr. F. Oldham, F.Inst.P.**	Thomas Young.	5.15 p.m.	Midland

FOURTH "PHYSICS IN INDUSTRY" CONFERENCE

Glasgow: June 25–28, 1952

The broad programme of the Institute's fourth "Physics in Industry" conference, to be held in Glasgow next June, has now been arranged. These conferences are intended to show something of the contribution which physics and physicists make to industrial efficiency and advancement; they are designed to attract the interest of industrialists and the general public, as well as the professional scientists. The theme of the Glasgow conference is "Physics in the transport, shipbuilding and engineering industries." The lectures and discussions will be of as general interest as possible and there will be an exhibition of instruments and equipment in which about fifty firms are taking part. The conference and exhibition will take place in the Royal Technical College, Glasgow, by kind permission of the Governors.

The arrangements have been made by an Organizing Committee under the chairmanship of Sir Andrew McCance. The Institute is particularly grateful to the local committee, under the chairmanship of Professor J. S. Rankin and with Mr. T. H. O'Beirne as secretary, which has undertaken most of the detailed work.

Full details of the conference and forms of application for accommodation will be circulated shortly. In the meantime, members may wish to have the following outline programme. It will be seen that social activities have been arranged; it is hoped that a good number of Institute members and their ladies will attend. No doubt, some members may wish to arrange a holiday in Scotland following the conference.

PROVISIONAL PROGRAMME OF THE CONFERENCE

Wednesday, June 25, 1952

Morning.

Formal opening of the conference and exhibition by the President of the Institute.

Lecture and discussion on "Physical properties of materials."

Lecture and discussion on "Meteorology and industry."

Conference lunch.

Afternoon.

Visits to the laboratories of the Royal Technical College, Glasgow.

Discussion on "The education and training of industrial physicists in Scotland."

Evening.

Address on "Physics and high quality reproduction of music and speech." This address will be open to the public and will be illustrated by demonstrations.

Followed by

Theatre visit.

Thursday, June 26, 1952

Morning.

Lecture and discussion on "Some applications of physics in shipbuilding."

Lecture and discussion on "Some applications of physics in transport."

Afternoon.

Visits to the laboratories of the University of Glasgow and of the Royal Technical College. Visits to shipyards.

Evening.

Reception and dance, at the kind invitation of the Lord Provost of Glasgow.

Friday, June 27, 1952

Morning.

Lecture and discussion on "Instrument control of industrial processes."

Lecture and discussion on "Noise and its suppression."

Afternoon.

Visit to Loch Sloy to see the hydro-electric plant.

Saturday, June 28, 1952

Morning.

Visits to local works and shipyards.

or

One-day bus tour or commence three-day bus tour of Scotland.

PROCEEDINGS OF THE PHYSICAL SOCIETY AND THE INSTITUTION OF ELECTRICAL ENGINEERS AT HALF RATE

Reciprocal arrangements have now been made with the Physical Society and the Institution of Electrical Engineers for members of all grades of The Institute of Physics to subscribe to the Proceedings of these bodies at half the current retail rate. This arrangement is being reciprocated by the Institute for members of those bodies. Those wishing to take advantage of this scheme should write in the first instance to the Secretary of the Institute, stating exactly which periodicals they wish to receive, accompanying it with the appropriate remittance (unless this was added to the annual subscription payment). Members of all grades are required to include in their letter a statement to the following effect: "I desire to receive copies of the above named periodicals for my own personal use and am not acting as an agent for a library" and they should state their grade of membership.

DETAILS OF PERIODICALS AVAILABLE

Proceedings of the Physical Society

Section A—Half-rate price, including postage, 52s. 6d. per annum. Issued monthly. This Section covers such subjects as: Thermodynamics; electrodynamics; quantum theory; spectra; microphysics and the physics of elementary particles.

Section B—Half-rate price, including postage, 52s. 6d. per annum. Issued monthly. This Section contains in general papers on macroscopic physics, and includes such subjects as: Properties of matter; acoustics; geometrical optics; electron optics; electrical discharges; physics of the earth atmosphere and ionosphere; colour physics; vacuum physics, etc.

Note.—Half-rate subscriptions will only be accepted by the Physical Society for one section.

Proceedings of the Institution of Electrical Engineers

Part I—General. Half-rate price, including postage, 12s. 6d. Issued bi-monthly. Abridged minutes of the meetings of The Institution. Papers read at Ordinary Meetings, even if they are Section papers, with Discussions. Non-Section papers accepted for publication only, if of general interest. The President's and Local Centre and Sub-Centre Chairmen's Addresses. Lectures, including Section Lectures, unless they are of Section interest only. Reports. Progress Reviews.

Part II—Power engineering. Half-rate price, including postage, 17s. 6d. Issued bi-monthly. Abridged minutes of the meetings of the Measurements, Supply and Utilization Sections. Papers read at meetings of these Sections. Measurements, Supply and Utilization Section papers accepted for publication only. Appropriate Section and Group Chairmen's Addresses. Appropriate Section Lectures of Section interest only. Non-Section papers of specialized interest read at Extra Meetings and appropriate to the Part.

Part III—Radio and Telecommunication engineering. Half-rate price, including postage, 17s. 6d. Issued bi-monthly. Abridged minutes of the meetings of the Radio Section. Papers read at Radio Section Meetings. Radio Section papers accepted for publication only. Radio Section and Group Chairmen's Addresses. Radio Section Lectures of Section interest only. Non-Section papers of specialized interest read at Extra Meetings and appropriate to the Part.

Part IV—Collected monographs. Half-rate price, including postage, 7s. 6d. Issued not less frequently than once a year. Papers likely to have an essential bearing on the work of a limited number of electrical engineers and scientists.

All four parts together—Half-rate price, including postage, £2 10s. 0d.

Note.—Half-rate subscriptions will be accepted by the Institution of Electrical Engineers for one or more parts.

As scientists we realize that colour is merely a question of the wavelengths of æthereal vibrations: but that does not seem to have dispelled the feeling that eyes which reflect light near wavelength 4 800 *are a subject for rhapsody whilst those which reflect wavelength* 5 300 *are left unsung.*

A. S. EDDINGTON.

NEW BOOKS

The Challenge of Atomic Energy. By E. H. BURHOP, F.Inst.P. (London: Lawrence and Wishart.) Pp. x + 137. Price 6*s*. 6*d*.

"If we do not end war, war will end us." This dictum, ascribed to Stanley Baldwin, gives, in words of one syllable, the gist of Dr. Burhop's book. The author has shown, with convincing clarity, the necessity, over-riding all political considerations, of preventing a third world war. Chapter III, on "The atom bomb as a military weapon," should be read by all thoughtful citizens. It is doubtful, however, whether the 22-page summary of the technical significance of nuclear fission which comprises Chapter I, will be followed by readers with no scientific training. Although Dr. Burhop's condensation is masterly, the space he allows himself is just not adequate. The non-scientific reader may well be left (unless he reads very carefully) with such impressions as (1) that the physical properties of the elements are independent of their degree of aggregation; (2) that there is only one kind of chemical bond; (3) that the Bohr atom adequately represents present-day views on atomic structure.

Our ideas on how to prevent a third world war will depend essentially on whether we expect the threat to peace to come mainly from Russia or from America. The author clearly expects the latter. The last chapter of the book describes the Peace Movement organized by those who share this view. Hence it deals with questions on which there is room for wide disagreement. But it is a pity that from so objective a start, the book should end on a subjective and emotional note.

The reviewer is not here concerned with the rightness or wrongness of the views expressed: his opinions are of no special value. But the appeal of the book which could have been so wide will certainly be limited by the introduction of this highly controversial material.

In wishing the book a very wide circulation, it is suggested that, in a second edition of the same length, there should be an increase in the space allotted to Chapter I at the expense of a reduction in the non-factual sections of Chapter VI.

G. W. SCOTT BLAIR

The Electric Current. By P. DUNSHEATH, C.B.E., M.A., D.Sc., F.Inst.P. (London: G. Bell and Sons Ltd.) Pp. x + 211, with 22 plates. Price 18*s*. 6*d*.

This book is an account of the 1949–1950 Royal Institution Christmas lectures adapted to a juvenile auditory and is the 120th in this famous series started by Faraday. Dr. Dunsheath has re-captured the delightful atmosphere of his lectures and produced a most instructive book that can be thoroughly recommended for its interest and clarity. The experiments, which are such a feature of these courses, are fully described and well illustrated by plates and diagrams. Anyone, of any age, wishing to extend (or revise) his knowledge of the fundamental principles of electricity, the history of their discovery, and their wide application will find a wealth of information here.

Chapter 1, "Our electrical heritage," refers to a variety of familiar uses of the electric current such as stage lighting, traffic lights, telecommunications and television. "Early beginnings," describes the discoveries of Gilbert, Galvani, and Davy, and Faraday's work is covered in later chapters. The material that follows is arranged according to whether the electric current is flowing through metallic conductors (circuits, Ohm's law, etc.), liquids (electrolysis, storage batteries) or space (arcs, discharge tubes, valves and the cathode-ray tube). The generation of electric current is well and fully treated, the sections on hydroelectric plants, dynamos, power stations, transformers and the grid system being particularly good. The final chapter deals with domestic appliances. Appropriate warnings are given on the dangers of mis-using electrical apparatus, and there can surely be no better safeguard against an accident than the intelligent understanding of the principles of electricity, which the reader will acquire in a pleasant and easy manner from the book.

G. VAN PRAAGH

The materialist who is convinced that all phenomena arise from electrons and quanta and the like, controlled by mathematical formulae, must presumably hold the belief that his wife is a rather elaborate differential equation.

A. S. EDDINGTON.

APPOINTMENTS VACANT

The inclusion of particulars of a vacancy must not be taken to imply that the Institute necessarily approves of the terms offered or that might be offered. Candidates should satisfy themselves that these are satisfactory, and they may always refer to the Institute for advice.

Applications are invited by the **Ministry of Supply** for two posts in the Instrumentation Department of the Royal Aircraft Establishment, Farnborough.

(1) **Principal Scientific Officer—Physicist** to work on the improvement of existing techniques and investigation of new methods of photographic recording of experiments, including the use of long-focus lenses, and of colour photography. Candidates should have had considerable experience in optical and photographic work. A knowledge of the chemistry of photographic recording would be an advantage. Ref. A367/51A.

(2) **Senior Scientific Officer—Electrical Engineer** or **Physicist** for experimental work in the development of magnetic recorders and associated electronic circuits. Candidates should have had considerable experience in electronic circuit work and some knowledge or experience of the principles and practice of magnetic recording would be an advantage. Ref. A368/51A.

Candidates for each post should have a 1st or 2nd class honours degree, or equivalent qualification, in the appropriate subject, with at least 3 years post-graduate research experience. Salary will be assessed according to age, qualifications and experience within the ranges: Principal Scientific Officer (minimum age 31), £960–£1 295. Senior Scientific Officer (minimum age 26), £720–£910. Rates for women somewhat lower. Posts are unestablished but carry benefits under F.S.S.U. Application Forms obtainable from Ministry of Labour and National Service, Technical and Scientific Register (K), Almack House, 26–28 King Street, London, S.W.1, quoting appropriate reference number. Closing date 26 January, 1952.

Tootal Broadhurst Lee Company Limited have a vacancy for a young honours graduate in physics to do research work in the laboratory at their headquarters in Manchester. Salary according to qualifications and experience. The post is pensionable. Applications should be made to the Staff Manager, 56 Oxford Street, Manchester, 1.

The Division of Atomic Energy (Production) invites applications for the following posts as Principal Metallurgists at the Metallurgical Laboratories, Culcheth, nr. Warrington:

Post A.—To be responsible for the research work of laboratories engaged on studies of homogeneous and heterogeneous equilibria, using methods of physical metallurgy, metallography, X-ray crystallography and electron microscopy, and on supporting studies for research work on powder metallurgy, electro-chemistry, surface chemistry and deformation of metals.

Post B.—To be responsible for research into pyro-metallurgical reactions.

Post C.—To be responsible for research into powder metallurgy.

Candidates for any of these posts must either have a first- or second-class honours degree in physics, physical chemistry or metallurgy, or possess equivalent qualifications. Responsible post-graduate or research experience in fundamental investigations is essential.

Salaries will be assessed according to qualifications and experience within the range £960–£1 295 per annum. The posts carry F.S.S.U. benefits. Applications to Ministry of Supply, D.At.En. (P), Risley, nr. Warrington, Lancs, stating post applied for and quoting reference 273.

Applications are invited for the position of **Superintendent** of the Domestic Fuels and Appliances Department of the **British Coal Utilisation Research Association.**

Candidates should have a good honours degree in physics or engineering or equivalent qualification, with research and organizing experience. The main duties of the Superintendent will be to control investigations into combusion and heat transfer in domestic appliances of all types as well as research into the smokeless burning of bituminous coal, etc.

The appointment will be made within the salary scale of Principal Scientific Officer, £900–£1 380, depending on qualifications and experience. Permanent appointments come under the Federated Superannuation System for Universities. Applications in writing should be made to the Assistant Secretary, Ref. A.42, B.C.U.R.A., Randalls Road, Leatherhead, Surrey.

Principal Metallurgist required by the **Division of Atomic Energy (Production)**, Research and Development Branch, Windscale Works, Sellafield, Cumberland, to supervise the work of laboratories engaged on research into the metallurgy of radio-active materials.

Candidates must have a first- or second-class honours degree in metallurgy, physics or chemistry, Associateship of the Institution of Metallurgists, The Institute of Physics or the Royal Institute of Chemistry, or equivalent qualifications. They must have had post-graduate research experience or 2–3 years responsible laboratory experience in metallurgy.

Salary will be assessed according to qualifications and experience within the range £960–£1 295 per annum. The post will carry F.S.S.U. benefits. A house will be available within a reasonable period for the successful candidate, if married. Applications to Ministry of Supply, D.At.En. (P), Risley, nr. Warrington, Lancs, quoting reference 274.

The Division of Atomic Energy (Production) invites applications for appointments as **Senior Experimental Officers** and **Experimental Officers** in the Research and Development Branch to undertake experimental work on a wide range of problems in organic and inorganic chemistry, chemical engineering, experimental physics, metallurgy, heat transfer, welding of non-ferrous and ferrous materials, and biology. The appointments will be at laboratories located at Culcheth, nr. Warrington; Sellafield, Cumberland; and Salwick, nr. Preston, Lancs.

Candidates must possess at least a Higher School Certificate in a science subject, Higher National Certificate in Engineering or equivalent qualifications, but higher qualification would be an advantage. For the higher posts candidates must have had previous experience of experimental work and be at least 35 years old; for the lower posts they must be 28 years old.

Salaries will be assessed according to qualifications and experience within the ranges £742–£960 per annum and £545–£695 per annum. Rates for women are somewhat lower. At Sellafield and Salwick housing should be available within a reasonable period for the successful candidates, if married. Applications to Ministry of Supply, D.At.En. (P), Risley, nr. Warrington, Lancs, stating post applied for and quoting reference 276.

Senior electronics physicist or **engineer**, with expert knowledge of modern technique, required to take charge of Electronic Research and Development Department. Honours degree standard. Housing accommodation available, if desired. Application to be sent to The Secretary, **Barr and Stroud Limited**, Anniesland, Glasgow, W.3.

Junior Physicist required for electrical heating research. Preferably physics special degree, Grad.Inst.P. or equivalent. Starting salary in the range £350–£500 per annum according to age and experience. Applications should be addressed to The Director, **The Electrical Research Association**, 5 Wadsworth Road, Greenford, Middlesex.

The Division of Atomic Energy (Production) invites applications for appointments as **Senior Scientific Officers** in the Research and Development Branch to undertake research work on a wide range of problems in organic and inorganic chemistry, physical chemistry, thermo-chemistry, surface chemistry, physics, physical metallurgy, mechanical properties of metals and the melting and casting of metals. The appointments will be at laboratories located at Culcheth, nr. Warrington; Sellafield, Cumberland; and Salwick, nr. Preston, Lancs.

Candidates must either have a first- or second-class honours degree in chemistry, physics or metallurgy, or possess equivalent qualifications. Specialized experience in ion exchange or radio-chemical techniques would be an advantage for several of the posts; for others a background in metallurgy or inorganic chemistry is desirable.

Salary will be assessed according to qualifications and experience within the range £720–£910 per annum. The posts will carry F.S.S.U. benefits. At Sellafield and Salwick housing should be available within a reasonable period for the successful candidates, if married. Applications to Ministry of Supply, D.At.En. (P), Risley, nr. Warrington, Lancs, quoting reference 270.

Ferranti Limited, Edinburgh, have staff vacancies for engineers or physicists to work on the development of special valves to operate at microwave frequencies. Experience in this type of work is not essential, but applicants should have an honours degree in physics or engineering.

(1) **Senior Engineers**, with experience in charge of a development group, salary range according to qualifications and experience £1 000–£1 600 per annum.

(2) **Development Engineers**, salary £500 upwards per annum according to qualifications and any previous responsibility in development work.

These positions carry good prospects for advancement in an expanding organization. Contributory Pension Scheme. Apply quoting "VPL/E," giving full details of training, qualifications and experience to the Personnel Officer, Ferranti Limited, Ferry Road, Edinburgh.

The **University College of the Gold Coast** invites applications for the appointment of **Chief Technical Assistant** in the Department of Physics. The appointment will be on a three-year contract in the first instance, after which the contract may be renewed by mutual agreement. Salary £800 per annum plus a gratuity of £100 per annum in lieu of superannuation provision. Part furnished residential accommodation at rent not more than 10% of salary will be provided. Family allowances of £50 per child (up to a maximum of £150) if children are resident in the Gold Coast or £100 per child (up to a maximum of £300) if children are resident elsewhere. Free first-class passages will be provided for the selected candidate and his family on assumption and relinquishment of the appointment and for annual leave of eight weeks in the United Kingdom. Outfit and baggage allowances are paid on first appointment.

The duties will include the supervision and training of the departmental laboratory staff, responsibility for apparatus and stores, preparation of lecture and laboratory material for teaching up to B.Sc. (Special) Degree level, and preparation of material for the departmental museum.

Candidates should either have considerable experience of similar work in a university institution or an honours or special degree in physics. Opportunities for post-graduate research may be provided if a graduate is selected for the appointment.

Applications (six copies) with the names of three referees should be sent to the Assistant Registrar (London), University College of the Gold Coast, 6 Endsleigh Street, London, W.C.1, from whom further particulars may be obtained. Closing date 15 January, 1952.

Vacancy exists in Research and Development Laboratories in Essex for a scientist to lead a team concerned chiefly with the development of new materials. A General or Special degree is required and applicants with a knowledge of physics will be preferred but the essential qualification is the ability to take the responsibility for advancing development projects by logical methods and to deal with practical problems without continual direction.

Applicants should be not more than 30 years old. The post is permanent, pensionable and offers prospect for advancement. The commencing salary will be in the region of £650–£850 depending upon qualifications and experience. Particulars to Box No. A.V. 20, The Institute of Physics, 47 Belgrave Square, London, S.W.1.

Mathematicians and **Physicists** are invited by the **Ministry of Supply** to apply for the following posts in the grade of Senior Scientific Officer at Design Establishments in Kent and Sussex.

(1) **Mathematician** or **Mathematical Physicist** preferably with knowledge of statistical methods for analysis work in connection with assessment of weapons performance. Ref. A360/51A.

(2) **Physicist** with knowledge of optical and photographic work for scientific direction Instrumentation Group. Ref. A361/51A.

(3) **Physicist** for the determination of rheological characteristics of fuels. Ref. A362/51A.

Candidates should possess a 1st or 2nd class honours degree or equivalent qualification in mathematics or physics and have had at least 3 years relevant post-graduate research experience. They must be at least 26 years of age. Salary will be assessed according to age, qualifications and experience within the range: Senior Scientific Officer—£720–£910. Rates for women somewhat lower. Posts are unestablished but carry F.S.S.U. benefits. Application forms obtainable from Ministry of Labour and National Service, Technical and Scientific Register (K), Almack House, 26–28 King Street, London, S.W.1, quoting appropriate reference number. Closing date 26 January, 1952.

Research Assistants. Vacancies in small team working in modern research building on background and applied research mainly on chemical engineering development. Honours degree chemistry, physics or chemical engineering. Sound imaginative approach to problems more important than previous experience. Work involves lively contact with engineering, chemical engineering and works departments. Theoretical and laboratory investigations, pilot plant design, operation and testing, followed by full-scale plant design. The department is new with increasing scope providing good prospects. Commencing salary £525–£650 per annum, according to qualifications and experience. In addition a bonus determined by the Company's profits is normally paid annually. Temporary allowance granted pending settlement of accommodation. Apply, stating age, education, qualifications and experience to The Secretary, **Whessoe Limited**, Darlington, Co. Durham.

The University of Natal (Pietermaritzburg and Durban), South Africa, invite applications for a **Chair of Physics.** Duties to commence 1 March, 1952, or as early thereafter as possible.

Salary scales: Men—£850 × £30 — £1 180 × £20 — £1 200 per annum.

Women—£600 × £25 — £900 per annum.

Plus a cost of living allowance, at present £256 per annum for a married man and £109 per annum for a single person.

Salary scales in all South African universities are at present being reviewed by a Government Commission.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 5 Gordon Square, London, W.C.1. The closing date for the receipt of applications is 15 January, 1952.

A **Graduate** (or equivalent qualification) in chemistry, physics or chemical engineering required as Assistant in Works Chemist's Department of a large modern paper mill. The work is mainly concerned with technical control and development on plant, rather than in the Laboratory. Experience of the Paper Industry is not essential. Salary according to qualifications and experience. Hostel accommodation is available for single men. Application to Chief Mill Chemist, **Albert E. Reed and Company Limited**, Aylesford Paper Mills, Larkfield, Nr. Maidstone, Kent.

Electrical Engineers and **Physicists** are invited to apply for the following posts at the **Royal Aircraft Establishment,** South Farnborough, Hants.

(1) **Principal Scientific Officer** to act as Deputy Leader of a team engaged on the research and development of novel applications of radio techniques. The work is in the early stages and gives opportunity for the use of new ideas. Applicants should preferably have some experience in the planning and administration of research programmes and should be proficient in as many of the following fields as possible.

(*a*) Centimetric and V.H.F. techniques including aerial systems, diffraction theory, duplex and R.F. bridge networks, frequency and phase modulation.

(*b*) Circuit design including Information Theory.

(*c*) Engineering of robust electronic and electro-mechanical devices. Ref. D501/51A.

(2) **Senior Scientific Officer** and **Scientific Officer** to assist in various aspects of the work detailed above. Post-graduate experience of original work, either theoretical or experimental, on the diffraction of electro-magnetic waves would be an advantage for one post. Ref. A345/51A.

(3) **Senior Scientific Officer** to work on novel forms of sighting equipment. Some experience of radar systems is essential but the emphasis of the work will be on the applications, rather than the design of such systems. Ref. A346/51A.

Candidates should have a 1st or 2nd class honours degree or equivalent qualification in physics or electrical engineering. For the Principal and Senior posts some years of post-graduate research, in University or Industry, are required. Salaries will be assessed according to age, qualifications and experience within the ranges: Principal Scientific Officer (minimum age 31)—£960–£1 295. Senior Scientific Officer (minimum age 26)—£720–£910. Scientific Officer—£380–£620. Rates for women somewhat lower. Posts are unestablished but carry benefits under F.S.S.U. Application forms obtainable from Ministry of Labour and National Service, Technical and Scientific Register (K), Almack House, 26–28 King Street, London, S.W.1, quoting appropriate reference number. Closing date 24 January, 1952.

Electrical Engineers and **Physicists** are invited by the **Ministry of Supply** to apply for the following posts in the **Scientific Officer** class at the Instrument and Photographic Department of the Royal Aircraft Establishment, Farnborough, Hants.

(1) For the assessment of analogue computor and servo-mechanism techniques and the development of precision equipment in that field for use in aircraft. Ref. A347/51A.

(2) For the analysis of the complex dynamical problems arising in automatic control of aircraft and for research upon methods of control. An interest in aerodynamics, particularly stability and control, is desirable and candidates must be willing to fly as an observer. Some experience in research or development of light electrical or electronic equipment, or servo systems, and a knowledge of electronics would be advantageous. Ref. A348/51A.

(3) For research and development work in connection with gyroscopic and allied instruments. Some experience in experimental and design work is desirable and a practical knowledge of electronics would be an advantage. The work offers considerable scope for inventive ability. Ref. A349/51A.

(4) For the development of aircraft cameras, involving image movement compensation, exposure frequency control and gyroscopic stabilization. Some experience of experimental or design work in the photographic field is desirable. Ref. A350/51A.

Candidates should have a 1st or 2nd class honours degree or equivalent qualification in physics or electrical engineering. Applicants for the senior grade must be at least 26 years of age and should have at least 3 years post-graduate research experience. Salaries will be assessed according to age, qualifications and experience within the ranges: Senior Scientific Officer—£720–£910. Scientific Officer—£380–£620. Rates for women somewhat lower. The posts are unestablished but carry benefits under F.S.S.U. Application forms obtainable from Ministry of Labour and National Service, Technical and Scientific Register (K), Almack House, 26–28 King Street, London, S.W.1, quoting the appropriate reference number. Closing date 29 January, 1952.

MEMBERS' ADVERTISEMENTS

For sale. McGraw Hill books in excellent condition. *Introduction to Quantum Mechanics*, by Pauling and Wilson; *Electro-Magnetic Theory*, by Stratton. R. C. Kell, 115 Salmon Street, London, N.W.9.

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